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10/617,747	07/14/2003	Nobuko Okada	109100.01	3043
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OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER LIN, JAMES	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/617,747

Applicant(s)

OKADA ET AL.

Examiner

Jimmy Lin

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,5,7,9,13 and 25-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,7,9,13 and 25-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/15/07 has been entered.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 13 and 33-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no support for the general limitation of "a solvent removal device" (claim 13 on pg. 5). The specification only has support for providing a gas blowing <sup>means</sup> ~~ends~~ for blowing a gas to the substrate [0013] and blowing nitrogen to the surface of the substrate so that the solvent vapor evaporating from the droplets arranged on the substrate can be removed [0031].

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1, 5, 7, 9, 13, and 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/12396 (references made are to the English equivalent U.S. Patent No. 6,575,800, hereafter Kobayashi) in view of Yoshida et al. (U.S. Publication 2001/0016260), Forrest et al. (U.S. Patent 6,030,700), and Wotton et al. (U.S. Patent No. 6,390,618).

Kobayashi discloses a method of making an electroluminescent (EL) device, the method comprising:

- forming a first electrode 6;

- forming a bank 4;

- forming a hole injection-transportation layer 9;

- discharging an organic EL material and a solvent in a region encompassed by the bank from a nozzle of an ink jet head to form the EL layer 2;

- forming a second electrode 1 (col. 14, lines 42-62; Fig. 7).

Kobayashi does not explicitly teach that the hole injection-transportation layer is formed via an ink jet method. However, Kobayashi teaches that fluids can be introduced selectively into each picture element without wasting material when using an ink jet system (col. 5, lines 4-6). It would have been obvious to one of ordinary skill in the art at the time of invention to have deposited the hole injection-transportation layer via an ink jet method with a reasonable expectation of success. One would have been motivated to do so in order to have reduced the waste of the deposition material.

Kobayashi does not explicitly teach forcibly removing the solvent evaporating from a droplet of the hole injection-transportation liquid and the EL liquid arranged previously on the substrate by blowing gas on the substrate.

Kobayashi does teach individually drying the layers after forming each of the hole injection-transportation layer and EL layer (col. 14, lines 48-58). The drying processes are performed in order to remove solvent from the layers. Forrest teaches that blowing nitrogen at the substrate can remove solvent (col. 11, lines 5-6). It would have been obvious to one of ordinary skill in the art at the time of invention to have dried the layers of Kobayashi by blowing nitrogen at the substrate, as opposed to a baking process, with a reasonable expectation of success because Forrest teaches that such a method is operable for evaporating solvent.

Kobayashi and Forrest do not explicitly teach that the deposition and drying process are performed at the same time. However, Yoshida teaches that simultaneously depositing and drying a material will increase the rate of production, thereby reducing production costs [0006]. It would have been obvious to one of ordinary skill in the art at the time of invention to have simultaneously deposited and dried the hole injection-transportation layer and EL layer of Kobayashi with a reasonable expectation of success. One would have been motivated to do so in order to have reduced production costs. Thus, Kobayashi, Forrest, and Yoshida as a whole teach forcibly removing solvent vapors from the hole injection-transportation liquid and the EL liquid.

Kobayashi, Forrest, and Yoshida do not explicitly teach blowing gas on the substrate while simultaneously removing the solvent vapor through suction. However, the gas blown across the substrate must necessarily be exhausted actively or passively in order to maintain a steady state condition, as opposed to a system having increasing pressure due to the gas blown. Wotton teaches a method of blowing gas across a substrate and simultaneously using an active exhaust system 413 (col. 5, lines 61-63; Fig. 4). It would have been obvious to one of ordinary skill in the art at the time of invention to have used an active exhaust system during the deposition process of Kobayashi, Forrest, and Yoshida with a reasonable expectation of success. One would have been motivated to do so in order to have achieved steady state conditions when blowing gas at a substrate.

Kobayashi, Forrest, Yoshida, and Wotton do not explicitly teach discharging liquid droplets in an atmosphere having a low partial pressure of the solvent vapor. However, the combination of references suggest all the claimed steps, so such a limitation must necessarily occur in the process.

Claims 25,27,29,31,33: The gas would have flowed away from the ink jet head. See Wotton, Fig. 4).

Claims 26,28,30,32,34: Kobayashi, Forrest, Yoshida, and Wotton do not explicitly teach that the gas is blown at an angle of 30 to 60 degrees to a direction perpendicular to the movement direction of the ink jet head. However, Wotton teaches that blowing a gas at an angle creates turbulence to thereby accelerate evaporation (col. 2, lines 34-39; Fig. 2). The angle at which the gas is blown directly affects the evaporation rate and, thus, is a result-effective variable. A particular parameter can be recognized as a result-effective variable, i.e., a variable which

achieves a recognized result, and the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have blown the nitrogen gas of Forrest at an angle in order to have accelerated the evaporation rate of deposited liquids and to have further increased the rate of production. Additionally, it would have been obvious to one of ordinary skill in the art at the time of invention to have blown the gas at any angle, including the claimed range, with respect to the direction perpendicular to the movement of the ink jet head. One would have been motivated to do so in order to have optimized the turbulence and evaporation rate of the deposited liquids.

6. Claims 1, 5, 7, 9, 13, and 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (U.S. Patent 6,830,494) in view of Yoshida '260, Forrest '700, and Wotton '618.

Yamazaki discloses a method of making an organic EL device, the method comprising:  
forming first electrodes 112;  
forming banks 105 (Fig. 1C);  
forming a second electrode 48 (Fig. 5);

discharging liquid droplets containing organic EL material and a solvent from an ink-jet printer to a substrate over the first electrodes (col. 10, lines 62-64; Fig. 1C).

Yamazaki teaches a drying process in order to remove solvent from the EL layer after deposition (col. 12, lines 26-29), but does not explicitly teach forcibly removing a solvent vapor evaporating from a droplet by blowing gas on the substrate and simultaneously removing the solvent vapor through suction. However, such is obvious over Yoshida, Forrest, and Wotton, as discussed above.

Claim 13: Yamazaki teaches that the EL layer can comprise of a hole injection-transportation layer (col. 10, line 62-col. 11, line 3).

Claims 25-34 are rejected for substantially the same reasons discussed above.

7. Claims 1, 5, 7, 9, and 25-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase (WO 01/70506) in view of Wotton '618.

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Kawase teaches a method of making an electroluminescent device (paragraph bridging pgs. 3-4). Liquid droplets of organic EL material and a solvent are discharged through an ink jet head to positions on a substrate while the ink jet head is being moved relatively to the substrate (abstract). Gas is blown across the surface of the substrate during deposition (abstract), thereby forcibly removing the evaporating solvent vapor. Kawase also teaches that it is desirable to increase the drying speed of the deposited material (pg. 9, 1<sup>st</sup> full paragraph).

Kawase does not explicitly teach blowing gas on a substrate and simultaneously removing the solvent vapor through suction. However, such is obvious over Wotton as discussed above.

Claims 7,9: Kawase teaches that banks can be deposited onto the substrate in order to define the areas in which the EL materials are to be contained (paragraph bridging pgs. 4-5).

Kawase does not explicitly teach forming first and second electrodes on the EL substrate. However, the Examiner takes Official Notice that an EL display device requires a lower electrode and an upper electrode in order for the EL display device to function. Therefore, the EL display device of Kawase must necessarily have lower and upper electrodes in order to function properly.

Claims 25-32 are rejected for substantially the same reasons discussed above.

8. Claims 13 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase '506 in view of Wotton '618 as applied to claim 9, in view of Miyashita et al. (WO 98/24271; references made are to the English equivalent U.S. Patent 6,863,961).

Kawase does not explicitly teach that a hole transport material can be deposited. However, Miyashita teaches that red and green organic luminescent material can be ink-jet deposited for the red and green pixels, respectively. The blue pixel can be ink-jet deposited with a hole transport material (col. 11, lines 19-32). The addition of a hole injection-transportation layer onto the EL substrate can improve luminous efficiency (col. 7, lines 22-26). It would have been obvious to one of ordinary skill in the art at the time of invention to have formed a hole injection-transportation layer on the EL substrate of Kawase. One would have been motivated to do so in order to have improve the luminous efficiency of the EL display.

Claims 33-34 are rejected for substantially the same reasons discussed above.

9. Claims 1 and 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoki et al. (U.S. Patent 5,951,350) in view of Wotton '618.

Aoki teaches a method of making a plasma display panel (abstract). Liquid droplets are discharged from an ink jet head to positions on a substrate while the liquid discharge port is being moved relatively to the substrate (Fig. 9). An air nozzle can be attached to the ink jet head. Compressed air is blown onto the discharged liquid droplets to push the liquid droplets onto side walls. The airflow also dries the liquid droplets (col. 10, lines 55-67). The liquid droplets can be blended with a solvent to generate a desired viscosity (col. 7, lines 1-3). Thus, the evaporating solvent vapor is forcibly removed prior to completing droplet arrangement on the entire substrate.

Aoki does not explicitly teach blowing gas on the substrate and simultaneously removing the solvent vapor through suction. However, such is obvious over Wotton as discussed above.

Claim 25: Wotton teaches that the gas flows away from the ink jet head during suction.

Claim 26: Aoki does not explicitly teach blowing the gas at an angle of 30 to 60 degrees to a direction perpendicular to a movement direction of the ink jet head. Aoki only teaches that the air is blown to push the ink onto the side of the banks and to dry the ink (col. 10, lines 55-67). Aoki only exemplifies a gas being blown at 90 degrees perpendicular to the movement of the ink jet head (Fig. 9). However, one of ordinary skill in the art would have realized that the angle at which the gas is blown has no criticality on the process and, thus, would have blown the gas at any angle that would have been operable, including the claimed range. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have blown the gas of Aoki at an angle of 30 to 60 degrees because one of ordinary skill in the art would have expected the process to have worked at any angle of the gas stream.

### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined



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application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 5, 7, 9, 13, and 25-34 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2, 4, 6-7, 9, 15, 20-21, and 22-23 of U.S. Patent No. 6,623,097 in view of Wotton '618.

The present claims are merely variations and permutations of the claims of '097, except that '097 does not claim blowing gas at a substrate and simultaneously removing the solvent vapor through suction. However, such is obvious over Wotton as discussed above.

'097 does not teach blowing the gas at an angle of 30 to 60 degrees to a direction perpendicular to a movement direction of the ink jet head. However, claim 15 of '097 requires an ink jet apparatus that is configured to blow out a gas at an angle of 30 to 60 degrees to a perpendicular direction. It would have been obvious to one of ordinary skill in the art at the time of invention to have used the ink jet apparatus with the adjustable gas nozzle of claim 15 with a reasonable expectation of success because such an apparatus is operable as an ink jet head. One of ordinary skill would have adjusted the gas nozzle to an angle within the range of claim 15 of '097.

12. Claims 1, 5, 7, and 25-30 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4-5, and 7-9 of U.S. Patent No. 6,730,357 in view of Wotton '618.

Present claims 1 and 5 are merely variations and permutations of the claims of '357, except that '357 does not require blowing gas at a substrate and simultaneously removing the solvent vapor through suction. However, such is obvious over Wotton as discussed above.

'357 does not require first and second electrodes as required in present claims 7 and 9. However, an EL element must necessarily have first and second electrodes in order to function for its intended use of emitting light.

13. Claims 9, 13 and 31-34 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4-5, and 7-9 of U.S. Patent No. 6,730,357 in view of Wotton '618 and Miyashita '271.

'357 does not require forming banks and forming a hole injection-transportation layer. However, Miyashita teaches that forming banks on an EL substrate is well known. The banks function to separate the individual pixels and improve the contrast of colors (col. 4, lines 48-50). It would have been obvious to one of ordinary skill in the art at the time of invention to have formed banks on the substrate of '357. One would have been motivated to do so in order to have improved the contrast of the EL display. Additionally, Miyashita teaches that the addition of a hole injection-transportation layer onto the EL substrate can improve luminous efficiency (col. 7, lines 22-26). It would have been obvious to one of ordinary skill in the art at the time of invention to have formed a hole injection-transportation layer on the EL substrate of '357. One would have been motivated to do so in order to have improve the luminous efficiency of the EL display.

#### ***Response to Arguments***

14. Applicant's arguments filed 3/15/2007 have been fully considered but they are not persuasive.

Claims 1-2, 5-10, 13-14, and 17-24 as rejected under 35 U.S.C. 112, 1<sup>st</sup> paragraph:

The Applicant argues on pg. 7 that the claims have been amended to include the feature the Examiner indicated is supported by the specification. However, part of claim 13 has not been amended to overcome the 35 U.S.C. 112, 1<sup>st</sup> paragraph rejection.

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Claims 1-2, 5-6, 17, and 19 as rejected over Kawase '506:

The Applicant argues on pg. 8 that Kawase does not teach or suggest "forcibly removing said solvent vapor by blowing gas on the substrate and simultaneously removing said solvent vapor through suction." However, Wotton '618 teaches such limitations, as discussed above.

Claims 1-2, 17, and 19 as rejected over Aoki '350:

The Applicant argues on pg. 8 that Aoki does not teach or suggest "forcibly removing said solvent vapor by blowing gas on the substrate and simultaneously removing said solvent vapor through suction." However, Wotton '618 teaches such limitations, as discussed above.

Claims 7-10, 21, and 23 as rejected over Kawase '506:

The Applicant argues on pg. 9 that Kawase does not teach or suggest "forcibly removing said solvent vapor by blowing gas on the substrate and simultaneously removing said solvent vapor through suction." However, Wotton '618 teaches such limitations, as discussed above.

Claims 13-14 as rejected over Kawase and Miyashita '271:

The Applicant argues on pg. 9 that Miyashita fails to remedy the deficiencies of Kawase. However, Wotton is used to remedy the deficiency of Kawase.

Claims 1-2, 5-10, 13-14, 17, 19, 21, and 23 as rejected over Yamazaki '494, Yoshida '260, and Forrest '700:

The Applicant argues on pg. 9 that Yamazaki, Yoshida, and Forrest do not teach or suggest "forcibly removing said solvent vapor by blowing gas on the substrate and simultaneously removing said solvent vapor through suction." However, Wotton '618 teaches such limitations, as discussed above.

New Claims 25-34:

The Applicant argues on pg. 9 that the prior art does not teach nor suggest "wherein during suction the gas flows away from the ink jet head" or "wherein the gas is blown at an angle

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of 30 to 60 degrees to a direction perpendicular to a movement direction of the ink jet head.”  
However, such limitations are obvious as discussed above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is 571-272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JL  
JL

  
**KEITH HENDRICKS**  
**PRIMARY EXAMINER**